SECTION 07 21 00 – THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Insulation Types required for this Project include the following, as identified on the Drawings:
   1. 1 ½" Rigid Insulation Board, R_{min}=7.5
   2. 2" Perimeter/Under Slab Rigid Insulation Board

1.2 SUBMITTALS

A. Product Data for type of insulation product specified.

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 FLAME AND SMOKE RATINGS

Insulation shall have a flame spread rating not exceeding 25 and a smoke development rating not exceeding 450 as determined by test procedures specified in ASTM E84, NFPA 255 and UL 723. Ratings shall be determined from tests performed on the composite of insulation, jacket or facing, and adhesive. Adhesives, mastics and cements shall meet the same individual ratings as the minimum requirements.

2.2 MANUFACTURERS

A. Known Acceptable Sources: Subject to compliance with requirements, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:
   1. Dow Chemical Co.
   2. Owens Corning Fiberglas Corporation
   3. Certainteed
   4. Thermafiber by USG.
   5. Thermax Insulation Board by Celotex

2.3 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation, including removing projections capable of puncturing or that interfere with insulation attachment.

3.3 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to written instructions of insulation manufacturer.

Protect top surface of horizontal insulation from damage during concrete work by applying protection board.

3.4 INSTALLATION OF RIDGID WALL INSULATION

A. Install board insulation on masonry substrates per the manufacturers recommended method.

3.5 PROTECTION

A. General: Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07210

SECTION 07 54 19 – ADHERED THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope: To install a complete adhered roofing system including membrane, flashings and other components.

B. Related Work: The work includes but is not limited to the installation of:

1. Substrate Preparation
2. Wood Blocking
3. Insulation
4. Roof Membrane
5. Fasteners
6. Adhesive for Flashings
7. Roof Membrane Flashings
8. Metal Flashings
9. Sealants

C. Upon successful completion of work the following warranties may be obtained:

1. Manufacture's Warranty
2. Roofing Contractor Warranty

1.2 QUALITY ASSURANCE

A. This roofing system shall be applied only by a Roofing Contractor authorized by The Manufacturer prior to bid (Manufacturer's "Applicator").

B. Upon completion of the installation and the delivery to The Manufacturer by the Applicator of a certification that all work has been done in strict accordance with the contract specifications and Manufacturer's requirements, an inspection shall be made by a Technical Representative of The Manufacturer to review the installed roof system.

C. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Owner, the Owner's Representative and The Manufacturer.

D. All work pertaining to the installation of Manufacturer's membrane and flashings shall only be completed by Applicator personnel trained and authorized by The Manufacturer in those procedures.

E. Membrane manufacturer shall to have successfully produced thermoplastic roofing membranes for over 10 years.

F. Membrane manufacturer shall confirm in writing that the formulation of membrane has remained virtually unchanged for over 10 years.

G. Membrane manufacturer shall have a direct employee designated as the technical representative. The technical representative shall visit the roof at the start of the project, and once a week until completed. The technical representative shall conduct a final inspection prior to the issuance of warranty.

1.3 SUBMITTALS

At the time of bidding, the Applicator shall submit to the Owner (or Representative) the following:

A. Copies of Specification.

B. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.

C. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.

D. Sample copy of the Manufacture's warranty.

E. Sample copy of Applicator's warranty.

F. Dimensioned shop drawings which shall include:

1. Outline of roof with roof size and elevations shown.
2. Details of flashing methods for penetrations.
3. Technical acceptance from the Manufacturer.

G. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and other industry standards or practices.

H. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.

I. Material Safety Data Sheets (MSDS)

1.4 CODE REQUIREMENTS

The applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

A. Factory Mutual Research Corporation (FM) - Norwood, MA

1. Fire/Windstorm classification: Class 1A-135

B. Underwriters Laboratories, Inc. - Northbrook, IL

1. Class A assembly

1 .5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.

B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.

C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weld ability.

D. As a general rule all adhesives shall be stored at temperatures between 40° F (5° C) and 80° F (27° C). Read instructions contained on adhesive canister for specific storage instructions.

E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

F. All materials which are determined to be damaged by the Owner's Representative or manufacture are to be removed from the job site and replaced at no cost to the Owner.

1 .6 JOB CONDITIONS

A. All materials may be installed under certain adverse weather conditions but only after consultation with manufacture, as installation time and system integrity may be affected.

B. Only as much of the new roofing as can be made weather tight each day, including all flashing and detail work, shall be installed. All seams shall be heat welded before leaving the job site that day.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

F. Uninterrupted water stops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Water stops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

G. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over 9 oz felt or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

H. Prior to and during application, all dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods.

I. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

J. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.

K. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.

L. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.

M. All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacture to determine the corrective steps to be taken.

N. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.

O. The Applicator shall conduct fastener pullout tests in accordance with the latest version of the SPRI/ANSI Fastener Pullout Standard to help verify condition of the deck/substrate and to confirm expected pullout values.

P. Precautions shall be taken when using solvent adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

Q. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

1 .7 WARRANTIES

A. Manufacturer's 20-Year System No Dollar Limited Warranty: Upon successful completion of the work to Manufacturer's satisfaction and receipt of final payment, the Manufacturer's *20* Year No Dollar Limit System Warranty shall be issued.

B. Applicator/Roofing Contractor 5-Year Warranty: The Applicator shall supply the Owner with a separate 5 year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the Applicator warranty term, defective or otherwise not in accordance with the Contract Documents, the Applicator shall repair that defect at no cost to the Owner. The Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to The Manufacturer.

C. Owner Responsibility: Owner shall notify both The Manufacturer and the Applicator of any leaks as they occur during the time period when both warranties are in effect.

PART 2 PRODUCTS

2.1 GENERAL

A. The components of the Adhered roof system are to be products as indicated on the Detail Drawings and specified in the Contract Documents.

2.2 MEMBRANE

A. Reinforced membrane

B. Membrane shall conform to ASTM D4434-96 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing," Classification: Type II or III

C. As manufactured, membrane shall conform to the following physical properties:

1. Color to be white.
2. Energy-Star rated with a minimum .68 solar reflectance and a three-year aged reflectance of at least .50 per ASTM E903.
3. Approved Manufactures: Sika, Fibertite XT, GenFlex
4. Membrane to be 80 mils minimum, a nominal membrane thickness will not be accepted.
5. No TPO membranes will be accepted.

2.3 FLASHING MATERIALS

A. Perimeter Edge Flashing

1. Edge-Tite Flashing: A prefabricated perimeter edge attachment and fascia assembly provided by manufacture. Edge-Tite is made from three distinct parts. The (base) rail is made of formed 0.050 inch (1.3 mm) thick, 5052-H32 mill-finish alloy aluminum in 12 foot (3.6 m) lengths, provided with predrilled fastening holes. The spring clips are 6 inches (152 mm) wide and made from 0.020 inch (0.5 mm) stainless steel. The snap-on fascia is made from 24 gauge (0.6 mm) G90 steel or from 0.040 inch (1.0 mm) aluminum in 12 foot (3.6 m) lengths. Edge-Tite is available in a variety of fascia widths. Color and fascia metal shall be standard manufactures color.
2. PVC Coated Clad Metal: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is to be of 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported PVC membrane laminated on one side. Non-Typical Edge

B. Miscellaneous Flashing

1. Reglet: A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs, reglet is produced from 6063-T5, 0.10 inch - 0.12 inch (2.5 mm - 3.0 mm) thick extruded aluminum.
2. Prefabstack: A prefabricated vent pipe flashing made from 0.048 inch (48 mil/1.2 mm) thick membrane.
3. Prefabcorners – Universal: Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or base flashings.
4. Multi-Purpose Sealant: A urethane sealant used at flashing terminations. Consult Product Data Sheet for additional information.

2 .4 INSULATION/OVERLAYMENT/RECOVER BOARD

A. Isocyanurate Insulation: Rigid isocyanurate foam insulation with black mat facers, for field and tapered systems will be used. Insulation system will have a minimum "R" value of 30. Insulation shall be a minimum of 20 PSI. Tapered crickets will be 1/2" in 12" min slope

B. DensDeck® Prime: A fire-tested, gypsum hardboard with glass-mat facers and a pre-primed surface on one side. DensDeck Prime is provided in a 4 x 8 ft (1.2 x 2.4 m) board size and in thicknesses of 1/4, 1/2 and 5/8 inch (6, 13 and 16 mm).

2 .5 ATTACHMENT COMPONENTS

A. Membrane Adhesive

1. Solvent Based Adhesive: A solvent-based reactivating-type adhesive used to attach the membrane to the substrate, either horizontally or vertically. Consult Product Data Sheets for additional information. Application rates are as follows:

   a. Due to an increase in viscosity when outdoor temperatures during installation are below 40° F (5° C), add ½ gal/100 ft² (0.2 l/m²) to rate for estimating purposes. Do not install when air temperature is within 5° F of dew point. Solvent evaporation time increases significantly when temperatures drop. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

2. Water Based Adhesive: A water-based adhesive used to attach the membrane to horizontal or near-horizontal substrates. Consult Product Data Sheets for additional information. Application rates are as follows:

   a. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40° F (5° C).
   b. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

B. Insulation Adhesive:

1. OMG Olybond500 Adhesive: A two component (Part A and B) low-rise polyurethane foam used to attach insulation to approved compatible substrates. Adhesive is applied with in bands 12 in. on center. Application rates are typically one gallon per square. Additional adhesive may be required for rougher surfaces. Consult Product Data Sheets for additional information.

    a. Not recommended for use with insulation boards larger than 4' x 4'.
    b. Place insulation board into the adhesive shortly after it has reached its maximum rise (typically within 2 minutes) and walk into place.
    c. Job site conditions may affect performance. Adhesive shall not be used if surface and/or ambient temperatures are below 45°F (7°C) during application or subsequent curing time.
    d. Minimum product temperature before entering the dispenser should be 72°F (22°C).
    e. Store between 45°F (7°C) and 95°F (35°C).
    f. Protect from freezing, any product that does freeze must be removed from the job site and disposed of per State and Federal regulations.
    g. Adhesive shall not be used during inclement weather.
    h. Adhesive shall not be applied to wet or damp surfaces.
    i. A min. of 14 gage bar placed 4 ft. (1.2 m) from the roof edge and fastened 12 in. (305 mm) o.c. to the structural deck with acceptable fasteners is required after installation of the roof membrane. The bar is to have a cover strip hot air welded over it. (only if building is over 30 ft in height.)

C. Perimeter 14 Gage Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch (25 mm) on center to allow various fastener spacing options. Consult Product Data Sheet for additional information.

2.6 MISCELLANEOUS ACCESSORIES

A. Aluminum Tape: A 2 inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at clad joints.
B. Sealing Tape Strip: Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry.
C. Multi-Purpose Tape: A high performance sealant tape used with metal flashings as a preventive measure against air and wind blown moisture entry.

2.7 SEALANTS AND PITCH POCKET FILLERS

A. Multi-Purpose Sealant (for termination details).

B. Adhesive (two-component urethane adhesive for pitch pocket toppings).

C. Depending on substrates, the following sealants are options for temporary overnight tie-ins:

1. Type III hot asphalt conforming to ASTM D312 (latest version).
2. Multiple layers of roofing cement and felt.
3. Spray-applied, water-resistant urethane foam.
4. Mechanical attachment with rigid bars and compressed sealant

2 .8 MISCELLANEOUS FASTENERS AND ANCHORS

A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

2 .9 RELATED MATERIALS

A. Wood Nailer: Treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on Project Drawings. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.
Note: Wood nailers or wood blocking for snow protection system shall be installed prior to the installation of the roof membrane whenever possible.

B. Plywood: When bonding directly to plywood, a minimum 1/2 inch (12 mm) CDX (C side out), smooth-surfaced exterior grade plywood with exterior grade glue shall be used. Rough-surfaced plywood or high fastener heads will require the use of an attached ¼" Dens Deck Prime behind the flashing membrane. Plywood, if used shall have a maximum moisture content of 19% by weight on a dry weight basis.

PART 3 EXECUTION

3 .1 PRE-CONSTRUCTION CONFERENCE

A. The Applicator, Owner's Representative/Designer and Manufacturer(s) shall attend a pre-construction conference. The meeting shall discuss all aspects of the project including but not limited to:

1. Safety
2. Set up
3. Construction schedule
4. Contract conditions
5. Coordination of the work

3 .2 SUBSTRATE CONDITION

A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials. Applicator shall verify that the work done under related sections meets the following conditions:

1. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.

2. All surfaces are smooth and free of dirt, debris and incompatible materials.
3. All roof surfaces shall be free of water, ice and snow.

3 .3 SUBSTRATE PREPARATION

A. The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner as to eliminate risk of deck overload due to concentrated weight. The Owner's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.

B. General Criteria: All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed. Remove only that amount of roofing and flashing which can be made weather tight with new materials during a one-day period or before the onset of inclement weather.

3 .4 SUBSTRATE INSPECTION

A. A dry, clean and smooth substrate shall be prepared to receive the adhered roof system.

B. The Applicator shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.

C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.

D. All roof surfaces shall be free of water, ice and snow.

E. All products shall be applied over compatible and accepted substrates only.

3 .5 WOOD NAILER INSTALLATION

A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Detail Drawings.

B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall also meet the requirements of the current Factory Mutual Loss Prevention Data Sheet 1-49.

C. Thickness shall be as required to match substrate and/or insulation height to allow a smooth transition.

D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.

3 .6 INSULATION INSTALLATION

General Criteria:

A. Insulation shall be installed according to insulation manufacturer's instructions.

B. Insulation shall be neatly cut to fit around penetrations and projections.

C. Do not install more insulation board than can be covered with membrane by the end of the day or the onset of inclement weather.

D. Use at least 2 layers of insulation when the total insulation thickness exceeds 2-1/2 inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.

E. Olympic Olybond500/ 500 Spot Shot Adhesive

1. Apply over properly installed and prepared substrates in bands 12 in. (13 mm) o.c. Allow to rise approximately 1/2-3/4 in. (13-19 mm). Lay insulation boards in adhesive and walk into place to ensure full embedment. CAUTION: Walking insulation boards in immediately after placement into adhesive may cause slippage/movement until adhesive starts to set up. On roof slopes greater than 1/2 inch (13 mm) in 12 inches (305 mm), begin adhering insulation at low point and work upward to avoid slippage. One person should be designated to walk in, trim/slit and apply weight to all insulation boards to ensure adequate securement. Only areas that can be made completely watertight in the same day's operations shall be coated.

2. For multiple layers of insulation spray adhesive over the base layer once fully secured and follow procedures above for attachment of each insulation layer.

F. Approved Insulation Boards Adhered to Approved Roof Substrate/Deck:

1. Polyisocyanurate, 1 inch (25 mm) minimum thickness (required for Systems Warranty).
2. Dens Deck® Prime

G. For uneven surfaces, trimming or slitting of boards may be necessary.

H. A min. of 1 bar placed 4 ft. (1.2 m) from the roof edge and fastened 12 in. (305 mm) o.c. to the structural deck with acceptable fasteners is required after installation of the roof membrane on building heights in excess of 29 feet. The bar is to have a cover strip hot air welded over it.

I. Installation Guidelines:

1. Not recommended for use with insulation boards larger than 4x4 ft. (1.2x1.2 m).
2. Place insulation board into the adhesive shortly after it has reached its maximum rise (typically within 2 minutes) and walk into place.
3. Job site conditions may affect performance. Adhesive shall not be used if surface and/or ambient temperatures are below 45°F (7°C) during application or subsequent curing time.
4. Minimum product temperature before entering the dispenser should be 72°F (22°C).
5. Store between 45°F (7°C) and 95°F (35°C).

6. Protect from freezing, any product that does freeze must be removed from the job site and disposed of per State and Federal regulations.
7. Adhesive shall not be used during inclement weather.
8. Adhesive shall not be applied to wet or damp surfaces.

3 .7 INSTALLATION OF MEMBRANE

A. The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.

B. Solvent Based Adhesive: Over the properly installed and prepared substrate surface, adhesive shall be applied using solvent-resistant ¾ inch (19 mm) nap paint rollers. The adhesive shall be applied to the substrate at a rate according to manufacture's requirements. The adhesive shall be applied in smooth, even coating with no gaps, globs, puddles or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be coated with adhesive.

1. The Applicator shall count the amount of pails of adhesive used per area per day to verify conformance to the specified adhesive rate.
2. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

C. Water Based Adhesive: Over the properly installed and prepared substrate, adhesive shall be poured out of the pail and spread using notched ¼ inch x ¼ inch x ¼ inch (6 mm x 6 mm x 6 mm) squeegees. The adhesive shall be applied at a rate according to manufactures requirements (no adhesive is placed on back of the membrane). The formation of a film on the surface of the adhesive shall not be allowed to occur. The membrane shall be carefully unrolled into the wet adhesive while the edges are overlapped 3 inches (75 mm). The membrane shall be pressed firmly into the adhesive layer with a water-filled, foam-covered lawn roller by frequent rolling in two directions.

1. Water based adhesive shall not be used if temperatures below 40° F (5° C) are expected during application or subsequent drying time.
2. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.
3. Waterbased adhesive shall not be used on vertical surfaces or sloped surfaces greater than a 2 inch (50 mm) rise per 1 horizontal foot (0.3 m).

3 .8 HOT-AIR WELDING OF SEAM OVERLAPS

A. General

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
2. Welding equipment shall be provided by or approved by membrane manufacture. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Manufacture's Technical Representative prior to welding.
3. All membrane to be welded shall be clean and dry.

B. Hand-Welding

1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
3. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and rolled lightly. For straight seams, the 1-1/2 inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the 3/4 inch (20 mm) wide nozzle shall be used.

C. Machine Welding

1. Machine welded seams are achieved by the use of automatic welding equipment. When using this equipment, manufacture's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated simultaneously off the generator.
2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

D. Quality Control of Welded Seams

1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator at locations as directed by the Owner's Representative or membrane manufacture's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner. Seam samples will be kept and provided to the owner's representative or manufacture's representative for inspection. Sample will be dated with time and location where sample was taken.

3 .9 MEMBRANE FLASHINGS

A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and Manufacture. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

B. Adhesive for Membrane Flashings

1. Over the properly installed and prepared flashing substrate, adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.

C. Install base flashing according to the Detail Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs. Peal stop is required by at the base of all tapered edge strips and at transitions, peaks, and valleys according to manufacture's details.

D. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Owner's Representative and Manufacture's Technical Department.

E. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the PVC membrane.

F. All flashing membranes shall be mechanically fastened along the counter-flashed top edge with pealstop at 6-8 inches (0.15-0.20 m) on center.

G. All flashings shall be terminated according to manufacture's recommended details.

H. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement.

3 .10 METAL FLASHINGS

A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:

1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.

B. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.

C. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.

D. Metal joints shall be watertight.

E. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).

F. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.

G. Counter flashings shall overlap base flashings at least 4 inches (100 mm).

H. Hook strips shall extend past wood nailers over wall surfaces by 1-1/2 inch (38 mm) minimum and shall be securely sealed from air entry.

3 .11 EDGE-TITE METAL

A. Weld one side of a strip of membrane along that perimeter edge to the top of the membrane. Position the membrane over the roof edge and down outside face of wall covering wood nailer(s) completely, allowing 1/2 inch (13 mm) excess membrane. Hot-air weld all seams making sure there are no voids in welds.

B. Apply a 3/8 inch (10 mm) bead of NP-1 sealant to the intersection of the right angle of the clean base rail. Install base rail from right to left as seen from rooftop, lapping joints 1 inch (25 mm).

C. Fasten base rail into the side of the nailer 12 inches (0.3 m) on center using #12 x 1-5/8 inch corrosion-resistant fasteners provided with Edge-Tite. Field cut sections as necessary. A second row of fastening may be required based upon site conditions. Exercise caution at perimeter of roof. Workers shall follow OSHA safety procedures.

D. Position spring clips at 6 foot (1.8 m) centers on base rail. Locate spring clips at fascia cover laps and at mid-span of fascia cover.

E. Fascia covers are installed from right to left as seen from rooftop. Position fascia cover on top of base rail and overlap preceding panel by 1 inch (25 mm) at notches provided. Snap covers into place. Field cut where necessary. Exercise caution at perimeter of roof. Workers shall follow OSHA safety procedures.

3 .12 TEMPORARY CUT-OFF

A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.10. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.

C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator's expense.

3 .13 COMPLETION

A. Prior to demobilization from the site, the work shall be reviewed by the Owner's Representative and the Applicator. All defects noted and non-compliances with the Specifications or the recommendations of Manufacture's shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Owner's Representative and manufacture prior to demobilization.

B. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

END OF SECTION 07 54 19

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SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes sheet metal flashing and trim in the following categories:
   1. Exposed trim, gravel stops, and fasciae.
   2. Copings.
   3. Metal flashing.
   4. Peel-and-stick through-wall flashings at precast concrete wall base.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section 04 20 00 "Unit Masonry."
   2. Section 07 92 00 "Joint Sealants."

C. Definition, Rain Drainage: Items for draining rain water such as gutters, downspouts, conductors, scuppers, and splashblocks.

1.2 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim as shown in the architectural drawings, to withstand structural movement, thermally induced movement, and exposure to weather without failing.

1.3 SUBMITTALS

A. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

B. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

C. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.5 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 METALS

A. Lead Sheet (if applicable): ASTM B 749, Type L51121, copper-bearing lead sheet, with a minimum thickness of 0.0625 inch except not less than 0.0937 inch thick for applications where burning (welding) is involved.

2.2 THROUGH-WALL FLASHING

A. At typical metal flashing shown at precast and masonry: Stainless steel sheet; ASTM A167. Type 304, soft-annealed with No.2D finish, nominal 0.025 inch thick.

2.3 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Burning Rod for Lead: Same composition as lead sheet.

B. Solder: ASTM B 32, Grade Sn50, used with rosin flux.

C. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

D. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

E. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

F. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Section 07 92 00 "Joint Sealants."

G. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.

H. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

I. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

J. Surface-mounted Reglets: At roof parapet walls shown, provide continuous aluminum, surface-mounted reglets with snap-in metal counter flashings to protect roof membrane base flashings.
   1. Known acceptable Source: Fry SM Surface Mounted Reglet by Fry Reglet.

2.4 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and results in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

E. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
   1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.5 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Roof-Drain Flashing (if applicable): Fabricate from Aluminum.

C. Rain Drainage Items (if applicable):

1. Scuppers: Aluminum
2. Typical: Coil-Coated Galvanized Steel Sheet.

2.6 COIL-COATED GALVANIZED STEEL SHEET FINISH

A. High-Performance Organic Coating Finish: Apply the following system by coil-coating process on galvanized steel sheet as recommended by coating manufacturers and applicator.
   1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
      a. Color and Gloss: As selected by RE from manufacturer's full range of choices for color and gloss.
      b. Known Acceptable Sources, Resin Manufacturers: Subject to compliance with requirements, provide fluoropolymer coating systems containing resins produced by one of the following manufacturers:
         1) Ausimont USA, Inc. (Hylar 5000)
         2) Elf Atochem North America, Inc. (Kynar 500)
   2. Known Acceptable Source, Coil-Coated Steel Sheet Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, Petersen Aluminum Corporation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.

D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches, except where pretinned surface would show in finished Work.
   1. Do not solder the following metals:
      a. Coil-coated galvanized steel sheet.
   2. Pretinning is not required for the following metals:
      a. Lead.
   3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.
   1. Use joint adhesive for nonmoving joints specified not to be soldered.
   2. Fill sealant well of surface-mounted reglets with non-sag urethane sealant specified in Section 07901.

G. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Separations: Separate metal from noncompatible metal and from corrosive substrates by coating surfaces at locations of contact with asphalt mastic at concealed location or with other permanent separation as recommended by manufacturer.
   1. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

J. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant or by lead wedges and sealant, or by interlocking folded seam, or by blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches and bed with sealant.

K. Roof-Drainage System (if applicable): Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.

L. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.

M. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:
   1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
   2. Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07 62 00

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Related work in other sections.
Compressible filler: 03 30 00

B. Delivery. - Sealants shall be delivered to the job site in sealed containers labeled to show the designated name, formula, or specification number, lot number, color, date of manufacture, shelf life, (curing time when applicable at 73.4 plus or minus 2°F and 50 plus or minus 10 percent humidity) manufacturer's directions, and name of manufacturer.

1.2 APPLICABLE DOCUMENTS

A. The current issues of the following documents in effect on the date of the invitation for bid form a part of this specification and are applicable to the extent specified herein.

B. Federal Specifications

TT-S-227 Sealing Compound; Rubber Base, Two Component (for Caulking, Sealing, and Glazing in Building Construction)

TT-S-230 Sealing Compound, Synthetic-Rubber Base, Single Component, Chemically Curing (for Caulking, Sealing and Glazing in Building Construction)

1.3 MATERIALS

A. Sealant. - Polysulfide:

Vertical surfaces:	Type I Class B compound
Horizontal non-traffic surfaces:	Type I Class A compound
Horizontal traffic surfaces:	Type II Class A compound

B. Primer. - Primer and sealants shall not stain surfaces to be sealed and shall be as recommended by the sealant manufacturer. Primer shall have been tested for durability on samples of the surfaces to be sealed.

1.4 INSTALLATION

Preparation of joint.

A. Concrete and masonry surfaces. Concrete and masonry surfaces in contact with sealant shall be dry, sound, and well brushed and wiped dust free. Oil or grease shall be removed with solvents, and surfaces shall be wiped with clean rags. Where surfaces have been treated, curing compounds, oil, or other such materials shall be removed by sand blasting or wire brushing. Laitance and mortar shall be removed from the joint cavity.

B. Primer. - Comply with compound manufacturer's recommendations for type of primer and its application for the substrate materials involved.

1.5 APPLICATION

A. Sealants. - The ambient temperature shall be between 40°F and 100°F when the sealant is applied. Compound shall be gun-applied with a nozzle of proper size to fit the width of joint indicated, and shall be forced into grooves with sufficient pressure to expel air and fill the groove solidly. Caulking shall be uniformly smooth and free of wrinkles, and shall be left sufficiently convex to result in a flush joint when dry. One coat of sealer shall be applied over joint after compound has dried sufficiently to develop a surface skin so as not to deform the surface of the joint.

B. Joints. - Joints shall be tooled slightly concave after sealant is installed.

C. Colors. - Sealants shall be colored with dye, colorfast and compatible with the material. Colors shall match the adjacent surfaces.

1.6 CLEANING

The surfaces adjoining the sealed joints shall be cleaned of smears or other soiling resulting from the sealing application.

1.7 QUALITY ASSURANCE

A. Submittals
1. Manufacturer's literature. - Literature shall state the procedures for pre-treatment of joint surfaces, and list approved joint surface materials as well as application instructions. Include a list showing the product proposed for use in each type of joint to be sealed.

1. Special guarantee. - Duration 20 years

END OF SECTION 07 92 00

SECTION 07 95 00 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Architectural joint systems for building interiors.
2. Architectural joint systems for building exteriors.

1.2 DEFINITIONS

A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage (plus or minus) of nominal value of joint width.

D. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

1.3 SUBMITTALS

A. Shop Drawings: Provide the following for each joint system specified:

1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, blockout requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
2. Architectural Joint System Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

    a. Manufacturer and model number for each joint system.
    b. Joint system location cross-referenced to Drawings.
    c. Nominal joint width.
    d. Movement capability.
    e. Classification as thermal or seismic.
    f. Materials, colors, and finishes.
    g. Product options.
    h. Fire-resistance ratings.

B. Samples for Initial Selection: For each type of joint system indicated.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for current products.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain architectural joint systems through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by COTR, except with COTR's approval. If modifications are proposed, submit comprehensive explanatory data to COTR for review.

D. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)".

E. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing.

1.5 COORDINATION

A. Coordinate installation of exterior wall and soffit joint systems with roof expansion assemblies to ensure that wall transitions are watertight. Roof expansion assemblies are specified in Division 07.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
2. High-Performance Organic Finish (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion

coating; Organic Coating: manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.

B. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Compression Seals: ASTM E 1612; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.

D. Strip Seals: ASTM E 1783; preformed elastomeric membrane or tubular extrusions having an internal baffle system and secured in or over a joint by a metal locking rail.

E. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

F. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.

G. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period.

H. Moisture Barrier: Flexible elastomeric material, EPDM, minimum 45 mils thick

I. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.2 ARCHITECTURAL JOINT SYSTEMS, GENERAL

A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where joint changes direction or abuts other materials.
2. Include factory-fabricated closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

B. Design architectural joint systems for the following size and movement characteristics:

1. Nominal Joint Width: As indicated on Drawings.
2. Maximum Joint Width: As indicated on Drawings
3. Minimum Joint Width: As indicated on Drawings.
4. Movement Capability: Plus or minus 50 percent.
5. Type of Movement: Thermal and Wind sway.

2.3 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING INTERIORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Architectural Art Mfg., Inc.
2. Balco, Inc.
3. Construction Specialties, Inc.
4. JointMaster/InPro Corporation.
5. Michael Rizza Company, LLC.
6. MM Systems Corporation.
7. Nystrom, Inc.
8. Watson Bowman Acme Corp.

B. Floor-to-Floor Joint Systems:

1. Type: Elastomeric Dual elastomeric seal.

a. Exposed Metal: Aluminum.

1) Finish: Manufacturer's standard finish.

b. Seal Material: Santoprene

1) Color: As selected by COTR from manufacturer's full range.

2. Cover-Plate Design: Recessed to accept field-applied finish materials.

a. Recess Depth: As required to accommodate adjacent flooring.

3. Attachment Method: Mechanical anchors
4. Load Capacity: Standard duty.

5. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
6. Moisture Barrier: Manufacturer's standard.

C. Floor-to-Wall Joint Systems:

1. Type: Elastomeric seal.

a. Exposed Metal: Aluminum.

1) Finish: Manufacturer's standard finish.

b. Seal Material: Santoprene

1) Color: As selected by COTR from manufacturer's full range.

2. Cover-Plate Design: Recessed to accept field-applied finish materials.

a. Recess Depth: As required to accommodate adjacent flooring.

3. Attachment Method: Mechanical anchors
4. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
5. Moisture Barrier: Manufacturer's standard.

D. Wall-to-Wall Joint Systems:

1. Type: Elastomeric seal:

a. Exposed Metal: Aluminum:

1) Finish: Manufacturer's standard finish.

b. Seal Material: Santoprene:

1) Color: As selected by COTR from manufacturer's full range.

2. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that indicated that of adjacent construction.
3. Moisture Barrier: Manufacturer's standard.

E. Wall-to-Ceiling Joint Systems:

1. Type: Glide plate.

a. Exposed Metal: Aluminum.

1) Finish: Manufacturer's standard finish.

2. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
3. Moisture Barrier: Manufacturer's standard.

2.4 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING EXTERIORS

A. Wall-to-Wall Joint Systems:

1. Basis of Design product: Balco, Inc. – FCVS-2

2. Type: Exterior Variable Seal.

a. Exposed Metal: Aluminum.

1) Finish: Manufacturer's standard mill finish.

b. Seal Material: Santoprene

1) Color: As selected by COTR from manufacturer's full range.

c. Recess Depth: As required to accommodate anchoring.

3. Attachment Method: Mechanical anchors
4. Load Capacity: Standard duty.
5. Moisture Barrier: Manufacturer's standard.

B. Roof to Roof Joint Systems:

1. Basis of Design product: Situra, Inc. – Redline 40G

2. Type: High Grade EPDM Elastomer Synthetic Rubber with polyester reinforcement on both edges.

3. Attachment Method: According to manufacturers recommendations.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where architectural joint systems will be installed for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to architectural joint system manufacturer's written instructions.

B. Repair concrete slabs using manufacturer's recommended repair grout of compressive strength adequate for anticipated structural loadings.

C. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

D. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing architectural joint assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install joint systems.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify COTR where discrepancies occur that will affect proper joint installation and performance.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
4. Locate in continuous contact with adjacent surfaces.
5. Standard-Duty Systems: Shim to level where required. Support underside of frames continuously to prevent vertical deflection when in service.
6. Heavy-Duty Systems: Repair or grout blockout as required for continuous frame support and to bring frame to proper level. Shimming is not allowed.
7. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.

E. Fire-Resistance-Rated Assemblies: Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

F. Water Barrier: Provide water barrier at exterior joints and where called for on Drawings. Provide drainage fittings at a maximum of 50 feet or where indicated.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 07 95 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior and exterior standard hollow metal doors and frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing as close to neutral pressure as possible according to NFPA 252 or UL 10B.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

C. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9 UBC Standard 7-4. Label each individual glazed lite.

D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Amweld Building Products, LLC.
2. Benchmark; a division of Therma-Tru Corporation.
3. Ceco Door Products; an Assa Abloy Group company.
4. Curries Company; an Assa Abloy Group company.
5. Deansteel Manufacturing Company, Inc.
6. Firedoor Corporation.
7. Fleming Door Products Ltd.; an Assa Abloy Group company.
8. Habersham Metal Products Company.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 G60 or A60 metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Section 08 80 00 "GLAZING".

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

1. Design: Flush panel
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

    a. Fire Door Core: As required to provide fire-protection ratings indicated.
    b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 4.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

        1) Locations: Exterior doors and interior doors where indicated.

3. Vertical Edges for Single-Acting Doors: Manufacturer's standard.

    a. Beveled Edge: 1/8 inch in 2 inches.

4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
5. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless)
2. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless)
3. Level 4 and Physical Performance Level A (Maximum Duty), Model 2 (Seamless).

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless) – Interior Doors, unless noted otherwise.
2. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless) – Secure Interior Doors, unless noted otherwise.
3. Level 4 and Physical Performance Level A (Maximum Duty), Model 2 (Seamless) – Link Doors, unless noted otherwise.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames full profile welded unless otherwise indicated.
3. Frames for Level 2 Steel Doors: 0.053-inch- thick steel sheet.
4. Frames for Level 3 Steel Doors: 0.053-inch- thick steel sheet.
5. Frames for Level 4 Steel Doors: 0.067-inch- thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as knocked down unless otherwise indicated.
3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
4. Frames for Level 2 Steel Doors: 0.053-inch- thick steel sheet.
5. Frames for Level 3 Steel Doors: 0.053-inch- thick steel sheet.
6. Frames for Level 4 Steel Doors: 0.067-inch- thick steel sheet.
7. Frames for Borrowed Lights: Same as adjacent door frame.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.7 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.8 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.
3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.

    c. Compression Type: Not less than two anchors in each jamb.
    d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Section 08 71 00 "DOOR HARDWARE."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.9 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. At fire-protection-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable glazing stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

    a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

6. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
8. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

    a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer.
2. Shop priming and factory finishing flush wood doors.

1.2 SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors.

D. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

C. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors.

1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
2. Provide WI-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
3. Provide WI-Certified Compliance Certificate for installation.

D. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Algoma Hardwoods, Inc.
2. Ampco, Inc.
3. Buell Door Company Inc.
4. Chappell Door Co.
5. Eagle Plywood & Door Manufacturing, Inc.
6. Eggers Industries.
7. Graham; an Assa Abloy Group company.

8. Haley Brothers, Inc.
9. Ideal Architectural Doors & Plywood.
10. Ipik Door Company.
11. Lambton Doors.
12. Marlite.
13. Marshfield Door Systems, Inc.
14. Mohawk Flush Doors, Inc.; a Masonite company.
15. Oshkosh Architectural Door Company.
16. Poncraft Door Company.
17. Vancouver Door Company.
18. VT Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

B. WDMA I.S.1-A Performance Grade: Heavy Duty

C. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-1, made with binder containing no urea-formaldehyde resin.
2. Blocking: Provide 5-inch wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors :

1. Grade: Premium, with Grade A faces.
2. Species: Red oak
3. Cut: Rotary cut
4. Core: Particleboard
5. WDMA I.S.1-A Performance Grade: Heavy Duty

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

2.5 SHOP PRIMING

A. Doors for Transparent Finish: Shop prime doors with stain (if required), other required pretreatments, and first coat of finish as specified in Section 09 91 00 "PAINTING". Seal all four edges, edges of cutouts, and mortises with first coat of finish.

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.

C. Transparent Finish:

1. Grade: Custom.
2. Finish: AWI catalyzed polyurethane system.
3. Staining: As selected by COTR from manufacturer's full range.
4. Effect: Filled finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 08 71 00 "DOOR HARDWARE".

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-

rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

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SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications listed below are referenced as the latest edition published as of the date of this document. The publications are referred to within the text by the basic designation only.

1. ASTM INTERNATIONAL (ASTM)

a.	ASTM E 283	Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
b.	ASTM F 883	Padlocks

2. BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

a.	BHMA A156.1	Butts and Hinges
b.	BHMA A156.12	Interconnected Locks & Latches
c.	BHMA A156.13	Mortise Locks & Latches, Series 1000
d.	BHMA A156.15	Closer Holder Release Devices
e.	BHMA A156.16	Auxiliary Hardware
f.	BHMA A156.17	Self Closing Hinges & Pivots
g.	BHMA A156.18	Materials and Finishes
h.	BHMA A156.2	Bored and Preassembled Locks and Latches
i.	BHMA A156.21	Thresholds
j.	BHMA A156.22	Door Gasketing and Edge Seal Systems
k.	BHMA A156.3	Exit Devices
l.	BHMA A156.4	Door Controls - Closers
m.	BHMA A156.5	Auxiliary Locks & Associated Products
n.	BHMA A156.6	Architectural Door Trim
o.	BHMA A156.7	Template Hinge Dimensions
p.	BHMA A156.8	Door Controls - Overhead Holders and Holders

3. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

a.	NFPA 101	Life Safety Code
b.	NFPA 80	Fire Doors and Fire Windows

4. STEEL DOOR INSTITUTE (SDI)

a.	SDI 100	Standard Steel Doors and Frames

5. UNDERWRITERS LABORATORIES (UL)

a. UL Bldg Mat Dir — Building Materials Directory

1.2 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 "SUBMITTAL PROCEDURES":

1. Shop Drawings

a. Hardware schedule;
b. Keying system

2. Product Data

a. Hardware items;

3. Manufacturer's Instructions

a. Installation

4. Operation and Maintenance Data

a. Hardware Schedule items, Data Package 1;
b. Submit in accordance with Section 01 78 23 "OPERATION AND MAINTENANCE DATA".

5. Closeout Submittals

a. Key bitting

1.3 HARDWARE SCHEDULE

A. Prepare and submit hardware schedule in the following form:

Hardware	Quantity	Reference Publication Type Size	No.	Mfr. Name and Catalog Finish	Key Control No.	BHMA Finish Designation Listed)	UL Mark (If Fire rated and Symbols

1.4 KEY BITTING CHART REQUIREMENTS

A. Submit key bitting charts to the Contracting Officer prior to completion of the work. Include:

1. Complete listing of all keys (AA1, AA2, etc.).
2. Complete listing of all key cuts (AA1-123456, AA2-123458).
3. Tabulation showing which key fits which door.
4. Copy of floor plan showing doors and door numbers.
5. Listing of 20 percent more key cuts than are presently required in each master system.

1.5 QUALITY ASSURANCE

A. Hardware Manufacturers and Modifications

B. Provide, as far as feasible, locks, hinges, pivots, and closers of one lock, hinge, pivot, or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hardware in original individual containers, complete with necessary appurtenances including fasteners and instructions. Mark each individual container with item number as shown in hardware schedule. Deliver permanent keys to the Contracting Officer, either directly or by certified mail. Deliver construction master keys with the locks.

PART 2 - PRODUCTS

2.1 TEMPLATE HARDWARE

A. Hardware to be applied to metal or to prefinished doors shall be made to template. Promptly furnish template information or templates to door and frame manufacturers. Template hinges shall conform to BHMA A156.7. Coordinate hardware items to prevent interference with other hardware.

2.2 HARDWARE FOR FIRE DOORS AND EXIT DOORS

A. Provide all hardware necessary to meet the requirements of NFPA 80 for fire doors and NFPA 101 for exit doors, as well as to other requirements specified, even if such hardware is not specifically mentioned under paragraph entitled "Hardware Schedule." Such hardware shall bear the label of Underwriters Laboratories, Inc., and be listed in UL Bldg Mat Dir or labeled and listed by another testing laboratory acceptable to the Contracting Officer.

2.3 HARDWARE ITEMS

A. Hinges, pivots, locks, latches, exit devices, bolts, and closers shall be clearly and permanently marked with the manufacturer's name or trademark where it will be visible after the item is installed. For closers with covers, the name or trademark may be beneath the cover.

B. Hinges:

Hinge Sizes Chart

Thickness of Doors in Inches	Width of Doors in Inches	Height of Hinge (Length of Joint) in Inches
7/8 to 1 1/8 screen	To 36	3
1 3/8	To 32	3 1/2
1 3/8	Over 32 to 37	4
1 3/4	To 36	4 1/2
1 3/4	Over 36 to 48	5 Heavy Weight
1 3/4	Over 48	6 Heavy Weight
2, 2 1/4 and 2 1/2	To 42	5 Heavy Weight
2, 2 1/4 and 2 1/2	Over 42	6 Heavy Weight

1. BHMA A156.1, 4 1/2 by 4 1/2 inches unless otherwise specified. Construct loose pin hinges for exterior doors and reverse-bevel interior doors so that pins will be non-removable when door is closed. Other antifriction bearing hinges may be provided in lieu of ball-bearing hinges.

C. Pivots: BHMA A156.4.

D. Spring Hinges: BHMA A156.17.

E. Locks and Latches

1. Mortise Locks and Latches: BHMA A156.13, Series 1000, Operational Grade 1, Security Grade 2. Provide mortise locks with escutcheons not less than 7 by 2 1/4 inches with a bushing at least 1/4 inch long. Cut escutcheons to suit cylinders and provide trim items with straight, beveled, or smoothly rounded sides, corners, and edges. Knobs and roses of mortise locks shall have screwless shanks and no exposed screws.
2. Bored Locks and Latches: BHMA A156.2, Series 4000, Grade 1.
3. Interconnected Locks and Latches: BHMA A156.12. Provide F96 or F97, unless otherwise specified.
4. Auxiliary Locks: BHMA A156.5, Grade 1.
5. Exit Devices: BHMA A156.3, Grade 1. Provide adjustable strikes for rim type and vertical rod devices. Provide open back strikes for pairs of doors with mortise and vertical rod devices. Touch bars shall be provided in lieu of conventional crossbars and arms.
6. Cylinders and Cores: Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores shall have seven pin tumblers. Cylinders shall be interchangeable and fully compatible with products from Best Lock Corp., which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.
7. Keying System: Provide a great master keying system. Provide construction interchangeable cores. Provide key cabinet as specified.
8. Lock Trim: Cast, forged, or heavy wrought construction and commercial plain design.

a. Knobs and Roses: In addition to meeting test requirements of BHMA A156.2 and BHMA A156.13, knobs, roses, and escutcheons shall be 0.050 inch thick if unreinforced. If reinforced, outer shell shall be 0.035 inch thick and combined thickness shall be 0.070 inch, except knob shanks shall be 0.060 inch thick.
b. Lever Handles: Provide lever handles. Lever handles for exit devices shall meet the test requirements of BHMA A156.13 for mortise locks. Lever handle locks shall have a breakaway feature such as a weakened spindle or a shear key to prevent irreparable damage to the lock when a force in excess of that specified in BHMA A156.13 is applied to the lever handle. Lever handles shall return to within 1/2 inch of the door face.
c. Texture: Provide knurled or abrasive coated knobs or lever handles for doors which are accessible to blind persons and which lead to dangerous areas.

9. Keys: Furnish seven change keys for each interchangeable core, furnish two control keys, six maters keys, and six construction master keys. Furnish a quantity of key blanks equal to 20 percent of the total number of change keys. Stamp each key with appropriate key control symbol and "U.S. property - Do not duplicate."
10. Door Bolts: BHMA A156.16. Provide dustproof strikes for bottom bolts, except for doors having metal thresholds. Automatic latching flush bolts: BHMA A156.3, Type 25.
11. Closers: BHMA A156.4, Series C02000, Grade 1, with PT 4C. Provide with brackets, arms, mounting devices, fasteners, full size covers, except at storefront mounting, and other features necessary for the particular application. Size closers in accordance with manufacturer's recommendations, or provide multi-size closers, Sizes 1 through 6, and list sizes in the Hardware Schedule. Provide manufacturer's 10 year warranty.

    a. Identification Marking: Engrave each closer with manufacturer's name or trademark, date of manufacture, and manufacturer's size designation located to be visible after installation.

12. Overhead Holders: BHMA A156.8.
13. Closer Holder-Release Devices: BHMA A156.15.
14. Door Protection Plates: BHMA A156.6.

    a. Sizes of Mop and Kick Plates: Width for single doors shall be 2 inches less than door width; width for pairs of doors shall be one inch less than door width. Height of kick plates shall be 10 inches for flush doors and one inch less than height of bottom rail for panel doors. Height of mop plates shall be 6 inches.

15. Door Stops and Silencers: BHMA A156.16. Silencers Type L03011. Provide three silencers for each single door, two for each pair.
16. Thresholds: BHMA A156.21. Use J35100, with vinyl or silicone rubber insert in face of stop, for exterior doors opening out, unless specified otherwise.
17. Weather Stripping Gasketing: BHMA A156.22. Provide the type and function designation where specified in paragraph entitled "Hardware Schedule". A set shall include head and jamb seals and, for pairs of doors, astragals. Air leakage of weather stripped doors shall not exceed 1.25 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E 283. Weather stripping shall be one of the following:

a. Extruded Aluminum Retainers: Extruded aluminum retainers not less than 0.050 inch wall thickness with vinyl, neoprene, silicone rubber, or polyurethane inserts. Aluminum shall be bronze anodized.
b. Interlocking Type: Zinc or bronze not less than 0.018 inch thick.
c. Spring Tension Type: Spring bronze or stainless steel not less than 0.008 inch thick.

18. Rain Drips: Extruded aluminum, not less than 0.08 inch thick, bronze anodized. Set drips in sealant conforming to Section 07 92 00 "JOINT SEALANTS" and fasten with stainless steel screws.

a. Door Rain Drips: Approximately 1 1/2 inches high by 5/8 inch projection. Align bottom with bottom edge of door.
b. Overhead Rain Drips: Approximately 1 1/2 inches high by 2 1/2 inches projection, with length equal to overall width of door frame. Align bottom with door frame rabbet.

19. Special Tools: Provide special tools, such as spanner and socket wrenches and dogging keys, required to service and adjust hardware items.

2.4 FASTENERS

A. Provide fasteners of proper type, quality, size, quantity, and finish with hardware. Fasteners exposed to weather shall be of nonferrous metal or stainless steel. Provide fasteners of type necessary to accomplish a permanent installation.

2.5 FINISHES

A. BHMA A156.18. Hardware shall have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which shall have aluminum paint finish, and except steel hinges which shall have BHMA 652 finish (satin chromium plated). Hinges for exterior doors shall be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish. Exposed parts of concealed closers shall have finish to match lock and door trim. Hardware for aluminum doors shall be finished to match the doors.

2.6 KEY CABINET AND CONTROL SYSTEM

A. BHMA A156.5, Type required to yield a capacity (number of hooks) 50 percent greater than the number of key changes used for door locks.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install hardware in accordance with manufacturers' printed instructions. Provide machine screws set in expansion shields for fastening hardware to solid concrete and masonry surfaces.

Provide toggle bolts where required for fastening to hollow core construction. Provide through bolts where necessary for satisfactory installation.

1. Weather Stripping Installation: Handle and install weather stripping so as to prevent damage. Provide full contact, weather-tight seals. Doors shall operate without binding.

    a. Stop-Applied Weather Stripping: Fasten in place with color-matched sheet metal screws not more than 9 inches o.c. after doors and frames have been finish painted.
    b. Interlocking Type Weather Stripping: Provide interlocking, self-adjusting type on heads and jambs and flexible hook type at sills. Nail weather stripping to door one inch o.c. and to heads and jambs at 4 inches o.c.
    c. Spring Tension Type Weather Stripping: Provide spring tension type on heads and jambs. Provide bronze nails with bronze, stainless steel nails with stainless steel. Space nails not more than 1 1/2 inches o.c.

2. Threshold Installation: Extend thresholds the full width of the opening and notch end for jamb stops. Set thresholds in a full bed of sealant and anchor to floor with cadmium-plated, countersunk, steel screws.

3.2 FIRE DOORS AND EXIT DOORS

A. Install hardware in accordance with NFPA 80 for fire doors, NFPA 101 for exit doors.

3.3 HARDWARE LOCATIONS

A. SDI 100, unless indicated or specified otherwise.

1. Kick and Armor Plates: Push side of single-acting doors. Both sides of double-acting doors.
2. Mop Plates: Bottom flush with bottom of door.

3.4 KEY CABINET AND CONTROL SYSTEM

A. Locate where directed by COTR. Tag one set of file keys and one set of duplicate keys. Place other keys in appropriately marked envelopes, or tag each key. Furnish complete instructions for setup and use of key control system. On tags and envelopes, indicate door and room numbers or master or grand master key.

3.5 FIELD QUALITY CONTROL

A. After installation, protect hardware from paint, stains, blemishes, and other damage until acceptance of work. Submit notice of testing 15 days before scheduled, so that testing can be witnessed by the Contracting Officer. Adjust hinges, locks, latches, bolts, holders, closers, and other items to operate properly. Demonstrate that permanent keys operate respective locks, and give keys to the Contracting Officer. Correct, repair, and finish, as directed, errors in cutting and fitting and damage to adjoining work.

3.6 HARDWARE SETS

A. Hardware for aluminum doors shall be provided under this section. Deliver Hardware templates and hardware, except field-applied hardware to the aluminum door and frame manufacturer for use in fabricating the doors and frames.

END OF SECTION 08 71 00

SECTION 08 91 00 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Fixed, extruded-aluminum louvers meeting the requirements of the Miami Dade County Building Code Compliance Office – File Classification: High Velocity Hurricane Zone NOA# 06-0602.04.

B. Related Sections include the following:

1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section, unless otherwise defined in this Section or in referenced standards.

B. Drainable-Blade Louver: Louver designed to collect and drain water to exterior at sill by means of gutters in front edges of blades and channels in jambs and mullions.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.

1. Wind Load: Uniform pressures (velocity pressures) indicated on structural drawings, acting inward or outward.

B. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units 48 inches wide by 48 inches high. Test units according to AMCA 500.

1. Perform testing on unpainted, cleaned, degreased units.
2. Perform water-penetration testing on louvers without screens.

1.4 SUBMITTALS

A. Product Data: For each type of product specified.

B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jambs, heads, and sills; and anchorage details and locations.

1. For installed louvers and vents indicated to comply with design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

D. Product Certificates: Signed by manufacturers of louvers certifying that the products furnished comply with requirements and are licensed to bear the AMCA seal based on tests made according to AMCA 500 and complying with AMCA's Certified Ratings Program.

E. Product Test Reports: Indicate compliance of products with requirements based on comprehensive testing of current products.

F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

G. Product Approval: Louvers approved by the Miami-Dade County BCCO for use in structures that have the ability to drain water that may penetrate. Approval based on tests and procedures performed in accordance with BCCO.

1.5 QUALITY ASSURANCE

A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of louvers that are similar to those indicated for this Project in material, design, and extent.

B. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

B. Storage: Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Airline Products Co.
2. Airolite Co.
3. All-Lite Louver Co.
4. American Warming and Ventilating, Inc.
5. Arrow United Industries.
6. Cesco Products.
7. Construction Specialties, Inc.
8. Dowco Products Group.
9. Greenheck Fan Corporation.
10. Hart & Cooley, Inc.; Reliable Metal Products Division.
11. Industrial Louvers, Inc.
12. NCA Manufacturing, Inc.
13. Riesner Vent Brick Corp.
14. Ruskin Manufacturing; Tomkins Industries, Inc.
15. Sunvent Industries; Sylro Sales Corp.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T6.

B. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated or required by Manufacturer. Do not use metals that are incompatible with joined materials.

C. Anchors and Inserts: Of type, size, and material required for loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.

2.3 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly.

B. Maintain equal louver blade spacing to produce uniform appearance.

C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Provide sill extensions and loose sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Louver Construction: Provide fixed-blade louvers with extruded-aluminum frames and blades.

B. Horizontal, Drainable-Blade Louvers: As follows:

1. Frame Depth: 6 inches, unless otherwise indicated.
2. Frame Thickness: 0.081 inch min.
3. Blade Thickness: 0.081 inch min
4. Blade Angle and Spacing: +/- 37 degrees and +/- 5 inches o.c. for 6-inch-deep louvers.
5. Gutters: Drain gutter in head frame and each blade.
6. Downspouts: Downspouts in jambs to drain water from louver for minimum water cascade from blade to blade.
7. Vertical Supports: Hidden vertical supports at 24" maximum center to center spacing to allow continuous line appearance up to 120 inches (3,048 mm).
8. Sill: Steeply angled integral sill eliminating areas of standing or trapped moisture where mold or mildew may thrive and effect indoor air quality.
9. Assembly: Maximum assembly size: 47 ½" x 71 ½" for factory assembled louvers. All welded construction.

C. Louver Performance Data:

1. Based on testing 48 inch x 48 inch size unit in accordance with AMCA 500.
2. Free Area: 57 percent, nominal.
3. Performance Requirements: Maximum standard airflow not less than 8500 cfm with not more than 0.20- inch wg static-pressure loss.

2.5 LOUVER SCREENS

A. General: Provide each exterior louver with louver screens complying with the following requirements:

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Bird screening, unless otherwise indicated.

B. Louver Screen Frames: Fabricate screen frames with mitered corners to louver sizes indicated and to comply with the following requirements:

1. Metal: Same kind and form and color of metal as indicated for louver to which screens are attached.
   a. Reinforce extruded-aluminum screen frames at corners with clips.

2. Finish:
3. Type: Removable/Rewirable frames with a driven spline or insert for securing screen mesh.

C. Louver Screening for Aluminum Louvers: As follows:

1. Bird Screening: 3/4-inch, 0.051-inch expanded, flattened aluminum screen in a removable frame.

2.6 ALUMINUM FACTORY FINISH

A. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Fluoropolymer Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.

   a. Color: As selected by COTR/RE from manufacturer's full range of colors.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate Setting Drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

A. Install units at locations indicated on the drawings and in accordance with manufacturer's instructions.

B. Locate and place louver units level, plumb, and at indicated alignment with adjacent work.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Install concealed gaskets, flashings, joint fillers, and insulation, as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.3 ADJUSTING, CLEANING, AND PROTECTING

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.

B. Periodically clean exposed surfaces of louvers and vents that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

C. Before final inspection, clean louver surfaces in accordance with manufacturer's instructions.

D. Protect louvers and vents from damage during construction. Use temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at the time of Substantial Completion.

E. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 08 91 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes non-load-bearing steel framing members for the following applications:

1. Interior framing systems (e.g., supports for partition walls, ceilings, furring, etc.).

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G60 hot-dip galvanized, unless otherwise indicated.

2.2 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. Steel Studs and Runners: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.0179 inch. 0.0346 inch min. thickness (20 ga. Structural stud) supporting wall hung items such as cabinetry, equipment, and fixtures, unless indicated otherwise on drawings.
2. Depth: As indicated on Drawings

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

1. Space studs as follows:

a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb, unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.

D. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 09 22 16

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SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior gypsum board.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Gypsum Co.
    b. BPB America Inc.
    c. G-P Gypsum.
    d. Lafarge North America Inc.
    e. National Gypsum Company.
    f. PABCO Gypsum.
    g. Temple.
    h. USG Corporation.

B. Regular Type:

1. Thickness: 5/8 inch, or as required by fire-resistance-rated assembly indicated on drawings.
2. Long Edges: Tapered

C. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.

1. Thickness: 1/2 inch.
2. Long Edges: Tapered.

2.3 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper, or as recommended by manufacturer
2. Exterior Gypsum Soffit Board: Paper, or as recommended by manufacturer
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

    a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.

4. Finish Coat: For third coat, use setting-type, sandable topping
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4-to 1/2-inch-wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Regular Type: Vertical surfaces, unless otherwise indicated.
2. Type X: As indicated on Drawings and Where required for fire-resistance-rated assembly.
3. Type C: Where required for specific fire-resistance-rated assembly indicated.
4. Ceiling Type: Ceiling surfaces.
5. Abuse-Resistant Type: As indicated on Drawings
6. Moisture- and Mold-Resistant Type: As indicated on Drawings

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing, unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners, unless otherwise indicated.
2. Bullnose Bead: Use where indicated
3. LC-Bead: Use where indicated
4. L-Bead: Use where indicated
5. U-Bead: Use at exposed panel edges unless otherwise indicated
6. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Install in locations indicated on Drawings

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated

a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.6 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

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SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient stair accessories.
3. Resilient molding accessories.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product indicated.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.4 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

1.5 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient but not less than four (4) unopened boxes for each type and finishproduct installed .

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.
b. Flexco, Inc.
c. Johnsonite
d. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TV (vinyl, thermoplastic) Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous) or Group II (layered).
3. Style: Cove (base with toe)

C. Minimum Thickness: 0.125 inch

D. Height: 4 inches

E. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.

F. Outside Corners: Preformed

G. Inside Corners: Preformed

H. Finish: If not otherwise indicated to be as selected by COTR from manufacturer's full range.

I. Colors and Patterns: If not otherwise indicated to be as selected by COTR from full range of industry colors.

2.2 RESILIENT STAIR ACCESSORIES

A. Resilient Stair Treads:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Endura Rubber Flooring; Division of Burke Industries, Inc.
c. Estrie Products International; American Biltrite (Canada) Ltd.
d. Flexco, Inc.
e. Johnsonite
f. Mondo Rubber International, Inc.
g. Musson, R. C. Rubber Co.
h. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
i. PRF USA, Inc.
j. R.C.A. Rubber Company (The).
k. Roppe Corporation, USA.
l. VPI, LLC; Floor Products Division.

B. Resilient Stair Treads Standard: ASTM F 2169.

1. Material Requirement: Type TS (rubber, vulcanized thermoset).
2. Surface Design:

a. Class 2, Pattern: As indicated on the Drawings.

3. Manufacturing Method: Group 2 tread with contrasting color for the visually impaired.

C. Nosing Style: Round

D. Nosing Height: 2 inches

E. Thickness: 1/4 inch and tapered to back edge.

F. Size: Lengths and depths to fit each stair tread in one piece

G. Risers: Smooth, flat, coved-toe, 7 inches high by length matching treads produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

1. Thickness: 0.125 inch

H. Stringers: Of same thickness as risers, height and length after cutting to fit risers and treads and to cover stair stringers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

I. Colors and Patterns: If not otherwise indicated, to be as selected by COTR from full range of industry colors.

2.3 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Flexco, Inc.
c. Johnsonite
d. R.C.A. Rubber Company (The).
e. Roppe Corporation, USA.
f. VPI, LLC; Floor Products Division.

B. Description: Carpet edge for glue-down applications, Nosing for carpet, Nosing for resilient floor covering, Reducer strip for resilient floor covering, Joiner for tile and carpet, or Transition strips.

C. Material: Vinyl

D. Profile and Dimensions: As indicated

E. Colors and Patterns: If not otherwise indicated, to be selected by COTR from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 65 13

SECTION 09 65 36 - STATIC-CONTROL RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Static-dissipative, solid vinyl floor tile.

1.2 PERFORMANCE REQUIREMENTS

A. Static-Dissipative Properties: Provide floor coverings with static-control properties indicated as determined by testing identical products per test method indicated by an independent testing and inspecting agency.

1. Electrical Resistance: Test per ASTM F 150 with 100-V applied voltage.

   a. Average greater than 1 megohm and less than or equal to 1000 megohms when test specimens are tested surface to ground.
   b. Average no less than 1 megohm and less than or equal to 1000 megohms when installed floor coverings are tested surface to ground.

2. Static Generation: Less than 300 V when tested per AATCC-134 at 20 percent relative humidity with conductive footwear.
3. Static Decay: 5000 to 0 V in less than 0.25seconds when tested per FED-STD-101C/4046.1.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of floor covering indicated.

C. Product Schedule: For floor covering. Use same designations indicated on Drawings.

D. Qualification Data: For qualified Installer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for floor coverings.

F. Field quality-control reports.

G. Maintenance Data: For each type of floor covering to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

B. Preinstallation Conference: Conduct conference at Project site

1. Review methods and procedures related to static-control resilient floor coverings including, but not limited to, the following:

a. Examination and preparation of substrates to receive floor covering.
b. Installation
c. Field quality-control testing.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer but not less than 50 deg F or more than 90 deg F.

1. Floor Tile: Store on flat surfaces.

1.6 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive floor coverings during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F

C. Close spaces to traffic during floor covering installation.

D. Close spaces to traffic for 48 hours after floor covering installation.

E. Install floor coverings after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed but not less than two (2) unopened boxes of each type, color and pattern of tile.

PART 2 - PRODUCTS

2.1 STATIC-DISSIPATIVE RESILIENT FLOOR COVERINGS

A. Static-Dissipative, Solid Vinyl Floor Tile: ASTM F 1700, Class I (monolithic), Type A (smooth surface).

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. AB ElectroStatic, a division of American Biltrite (Canada) Ltd.; Electrotile Static-Dissipative (STD).
   b. Flexco; Static Dissipative Solid Vinyl Tile.
   c. Forbo Flooring, Inc.; Colorex SD Static Dissipative Vinyl Tile.
   d. Gerflor, Architectural Floor Systems, Inc.; Mipolam Accord EL 7.
   e. Roppe Corporation, USA; StatDefend.
   f. 3M Specified Construction Products Division; Dissipative Vinyl Floor Tile.
   g. VPI, LLC, Floor Products Division; Statmate.

2. Thickness: In manufacturer's standard thickness, but not less than 0.08 inch.
3. Size: 12 by 12 inches
4. Seaming Method: Standard
5. Colors and Patterns: If not otherwise indicated, to be selected by COTR from full range of industry colors.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Static-Control Adhesive: Provided or approved by manufacturer; type that maintains electrical continuity of floor covering system to ground connection.

C. Grounding Strips: Provided or approved by manufacturer; type and size that maintains electrical continuity of floor covering system to ground connection.

D. Seamless-Installation Accessories:

1. Heat-Welding Bead: Solid-strand product of manufacturer for heat welding seams.

   a. Color: Match floor covering

2. Chemical-Bonding Compound: Product of manufacturer for chemically bonding seams.

E. Integral-Flash-Cove Base Accessories:

1. Cove Strip: 1-inch radius support strip provided or approved by manufacturer.
2. Cap Strip: provided or approved by manufacturer.
3. Corners: Metal inside and outside corners and end stops provided or approved by floor covering manufacturer.

F. Maintenance Floor Tiles: Special floor tiles inscribed "Conductive floor. Do not wax."

G. Floor Polish: Provide protective, static-control liquid floor polish products as recommended by floor covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion or static-control characteristics of floor coverings.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings and electrical continuity of floor covering systems.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor coverings until they are same temperature as space where they are to be installed.

1. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.3 INSTALLATION, GENERAL

A. Install static-control resilient floor covering according to manufacturer's written instructions.

B. Embed grounding strips in static-control adhesive. Extend grounding strips beyond perimeter of static-control resilient floor covering surfaces to ground connections.

C. Scribe, cut, and fit floor coverings to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

D. Extend floor coverings into toe spaces, door reveals, closets, and similar openings. Extend floor covering to center of door openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

F. Install floor coverings on covers for telephone and electrical ducts, and similar items in installation areas. Maintain overall continuity of color and pattern with pieces of floor coverings installed on covers. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.

G. Adhere floor coverings to substrates using a full spread of static-control adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

H. Seamless Installation:

1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless floor covering. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on floor covering surfaces.

I. Integral-Flash-Cove Base: Cove floor coverings 6 inches up vertical surfaces. Support floor coverings at horizontal and vertical junction with cove strip. Butt at top against cap strip.

1. Install metal corners at inside and outside corners.

3.4 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half floor tile at perimeter.

1. Lay floor tiles square with room axis

C. Match floor tiles for color and pattern by selecting floor tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.

1. Lay static-dissipative, vinyl composition floor tiles grain direction alternating in adjacent floor tiles (basket-weave pattern).

D. In each space where conductive, solid vinyl floor tile is installed, install maintenance floor tile identifying conductive floor tile in location approved by COTR.

3.5 SHEET FLOOR COVERING INSTALLATION

A. Comply with manufacturer's written instructions for installing sheet floor coverings.

B. Unroll sheet floor coverings and allow them to stabilize before cutting and fitting.

C. Lay out sheet floor coverings as follows:

1. Maintain uniformity of sheet floor covering direction.
2. Minimize number of seams and place them in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.
3. Match edges of floor coverings for color shading at seams.
4. Avoid cross seams.

3.6 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to test electrical resistance of static-control resilient floor covering systems for compliance with requirements.

1. Arrange for testing after installation static-control adhesives have fully cured and floor covering systems have stabilized to ambient conditions and after ground connections are completed.
2. Arrange for testing of floor coverings before and after performing floor polish procedures.

B. Static-control resilient floor coverings will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.

B. Perform the following operations immediately after completing floor covering installation:

1. Remove static-control adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

1. Do not wax static-control resilient floor coverings.
2. If recommended in writing by manufacturer, apply protective static-control floor polish formulated to maintain or enhance floor covering's electrical properties to floor covering surfaces that are free from soil, static-control adhesive, and surface blemishes.

a. Verify that both floor polish and its application method are approved by manufacturer and that floor polish will not leave an insulating film that reduces floor coverings' effectiveness for static control.

D. Cover floor coverings until Substantial Completion.

END OF SECTION 09 65 36

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SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes typical painting of interior and exterior surfaces to include but not necessarily limited to the following:
   1. Exterior masonry blockwork, if applicable
   2. Interior ceilings
   3. Factory primed metal doors and frames

B. Mill applied, factory applied, and shop applied prime and finish coat materials will be specific with the product.

1.2 SUBMITTALS

A. Product Data: For each paint system specified, including block fillers and primers as required.
   1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
   2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
   3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples for Verification: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.
   1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
   2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this project .

B. Single-Source Responsibility: Provide primers and undercoat material produced by the same manufacturer as the finish coats for each type of coating. Use only thinners recommended by the manufacturer and only within recommended limits.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
   1. Product name or title of material.
   2. Product description (generic classification or binder type).

3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.
9. Handling instructions and precautions.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
   1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.5 PROJECT CONDITIONS

A. Apply coatings only when the temperature of surfaces to be coated and surrounding air temperatures are between 45 and 95 deg F.

B. Do not apply coatings in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
   1. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing coating operation.
   2. Work may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
   1. Devoe and Raynolds Co. (Devoe).
   2. Fuller O'Brien (Fuller).
   3. The Glidden Company (Glidden).
   4. Benjamin Moore and Co. (Moore).
   5. PPG Industries, Pittsburgh Paints (PPG).
   6. Pratt and Lambert (P & L).
   7. The Sherwin-Williams Company (S-W).

2.2 INTERIOR PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

B. Material Quality: Provide the manufacturer's paint material equal to or better than best quality of the various manufacturer and coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.
   1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions. Include percentage of pigment content and other materials.

C. Colors: Provide color selections as specified in Interior Finish Material Schedule.

2.3 PRIMERS

A. Primers: Provide the manufacturer's recommended factory-formulated primers that are compatible with the substrate and finish coats indicated.
   1. Concrete and Masonry Surfaces: Suitable for epoxy paint finish coat.
   2. New Plaster Primers: Interior flat latex-based paint.
   3. Gypsum Drywall Primer: White interior latex-based primer.

2.4 UNDERCOAT MATERIALS

A. Undercoat Materials: Provide the manufacturer's recommended factory-formulated undercoat materials that are compatible with the substrate and finish coats indicated.
   1. Interior Enamel Undercoat: Ready-mixed alkyd enamel.

2.5 INTERIOR FINISH PAINT MATERIAL

A. Finish Paint: Provide the manufacturer's recommended factory-formulated finish-coat materials that are compatible with the substrate and undercoats indicated.
   1. Gypsum Wallboard and Existing Plaster: Interior, Latex-Based Paint, Ready-mixed, latex-based paint.
      a) Semigloss finish at plaster
      b) Manufacturers suggested scrubbable finishes submitted to Architect for selection at gypsum board at walls and ceilings.

2.6 EXTERIOR CONCRETE MASONRY SURFACES (IF APPLICABLE)

A. Basis for Design at Single Wythe Exterior Concrete Masonry Surfaces: The following special coating system establishes the basis for design:
   1. Provide two-component, pigmented, aliphatic, polyurethane coating over epoxy primer over epoxy block filler as follows:
   2. Block filler: High performance epoxy block filler, at average 10 mils dry film thickness.
   3. Intermediate Coat: 1 coat of epoxy base coat at 3 to 5 mils minimum dry film thickness
   4. Top/Color Coat: 1 coat of two-component, acrylic aliphatic polyurethane at 2 mils minimum dry film thickness. Custom colors at each surface shall be as selected by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied.
   1. Do not begin to apply paint until unsatisfactory conditions have been corrected.
   2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
   1. Notify the RE about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.
   1. Provide barrier coats over incompatible primers and previously coated surfaces or remove and reprime. Notify Architect in writing about anticipated problems using the specified finish-coat material with substrates primed by others.
   2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen, as required, to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
      a. Use abrasive-blast cleaning methods if recommended by the paint manufacturer.
      b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
      c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.

   3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
b. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
c. When transparent finish is required, backprime with spar varnish.
d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.
f. Previously Coated Opaque Finish: Remove loose coats of finish using blade scraper and wire brush. Sand remaining finish to feather imperfections using consecutive 100-grit and 200 grit sandpaper. Lightly sand entire surface with 200-grit sandpaper. Seal and prime pursuant to this document.

4. Ferrous Metals: Clean nongalvanized, ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).
   a. Blast steel surfaces clean as recommended by the paint system manufacturer and according to requirements of SSPC specification SSPC-SP 10.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.
5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
3. Use only thinners approved by the paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

1. Paint colors, surface treatments, and finishes are to be provided by the Architect.
2. Provide primer coats that are compatible with finish coats used.
3. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.
4. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
6. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
7. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
8. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
10. Finish exterior doors on interior face and tops, bottoms, and side edges the same as exterior faces.
11. Sand lightly between each succeeding enamel or varnish coat.
12. Omit primer on metal surfaces that have been shop-primed and touch-up painted.

C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
   1. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.
   1. Brushes: Use brushes best suited for the material applied.
   2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
   3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

E. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer for color scheduled.

F. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

G. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been

prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appear, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

H. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

I. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

M.. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

3.4 FIELD QUALITY CONTROL

A. The Resident Engineer (RE) reserves the right to invoke the following test procedure at any time and as often as the Resident Engineer (RE) deems necessary during the period when paint is being applied:
   1. The Resident Engineer (RE) will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
   2. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:
      a. Quantitative materials analysis.
      b. Abrasion resistance.
      c. Apparent reflectivity.
      d. Flexibility.
      e. Washability.
      f. Absorption.
      g. Accelerated weathering.
      h. Dry opacity.
      i. Accelerated yellowness.
      j. Recoating.
      k. Skinning.
      l. Color retention.
      m. Alkali and mildew resistance.
   3. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
   1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
   1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 INTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated.

B. Concrete and Masonry: See para. 2.6 above.

C. Gypsum Drywall Systems:
   1. Lusterless (Flat) Emulsion Finish: Two coats.
      a. Primer: White, interior, latex-based primer.
      b. Finish Coat: Interior, satin, latex-based paint.
   2. Semigloss Enamel Finish: Three coats with total dry film thickness not less than 2.5 mils.
      a. Primer: Interior, flat, latex-based paint.
      b. Undercoat: Interior enamel undercoat.
      c. Finish Coat: Interior, semigloss, odorless, alkyd enamel.

D. Woodwork and Hardboard
   1. Semigloss Enamel Finish: Three coats.
      a. Undercoat: Interior enamel undercoat.
      b. First and Second Coats: Interior, semigloss, odorless, alkyd enamel.

E. Factory Primed Metal Doors and Frames
   1. Semigloss enamel finish: Two coats
      a. Undercoat: Exterior enamel undercoat
      b. Finish Coat: Exterior, semigloss, odorless alkyd enamel.

END OF SECTION 09 91 00

SECTION 09 94 13 - TEXTURE FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide architectural coating application on precast concrete as noted on drawings. Architectural coating colors shall be as indicated on drawings.

1.2 SUBMITTALS

A. Product Data: For paint system indicated. Include block fillers and primers.

1. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
2. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
4. MSDS for each paint product used.

B. Qualification Data: For Applicator.

1.3 DELIVERY AND STORAGE

A. Deliver materials to the project site in original, factory-sealed containers or packages labeled with identification of contents, manufacturer's name and address, manufacturer's tradesman or trademark, date of manufacture, specification number, batch number, color, instructions for use, and recommendations for protective measures against toxicity. Protect and store materials under cover in dry, well-ventilated areas. Keep in original tightly sealed containers or packages, and in such sequence that oldest stocks are used first. Store at temperatures between 40 and 120 degrees F, and preferably below 100 degrees F. Skins formed on surface of material must be removed prior to moving containers, mixing, or using.

1.4 WARRANTY

A. On completion, provide the FAA with manufacturer's written 10-year "Limited Warranty" for product replacement.

PART 2 - PRODUCTS

2.1 COATING SYSTEM

A. Basis-of-Design Manufacturer: Provide TEX-COTE 600, Textured Coating - A high build 100 percent acrylic terpolymer (water base) coating with elastomeric properties featuring rapid

drying and adhesion. Manufactured by Textured Coatings of America, Inc. Primer to be TEX-COTE XL-70; Colors provided to match colors as scheduled on drawings; Texture to be smooth.

B. Performance Criteria:

1. Twin ARC Weatherometer (Hours) - 5,000.
2. Federal Test TT-C-555b - Passes.
3. Freeze/Thaw Cycles - 300.
4. Flame Spread Rating ASTM - E84-Class A.
5. Wind-Driven Rain Test (98 MPH/24 Hours) - Passes.
6. Salt Spray Test ASTM B-117 64 (Hours) - 300.
7. Alkali Resistance GSA Exception #1 to TT-C-555b - Passes.

2.2 EQUIPMENT

A. Spray Equipment shall be Graco President 10:01 Pump with Craco 204-000 Spray Gun or Graco Tex-Spray GM 1030.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

A. Apply coating only when temperature of surfaces to be coated and surrounding air temperatures are between 45 degrees F and 100 degrees F, unless otherwise permitted by manufacturer's printed instruction. Do not apply over frozen or damp surfaces, or when rain is imminent. Incompatible substrate release agents, form oils, and any foreign material are removed prior to priming and coating. Roof and parapet top caps are installed and sealed against water penetration prior to priming and coating. Primer shall not be exposed to ultra violet for more than 4 weeks prior to application of coating. If exposure exceeds 4 weeks, primer shall be re-coated. Material use is above grade only. Do not use below grade. Joint sealants must cure a minimum of 10 days. Excess sealant surface oils should be removed with a xylene solvent prior to applying the primer and/or textured coating.

3.2 INSPECTION

A. Applicator must examine areas and conditions under which special coating work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until satisfactory conditions have been corrected in a manner acceptable to applicator. Starting of special coating will be construed as applicator's acceptance of surfaces and conditions within any particular area.

3.3 SURFACE PREPARATIONS

A. Perform preparation and cleaning procedures in accordance with coating system manufacturer's instructions and as herein specified, for each particular substrate and coating condition.

B. Protection: Remove hardware, hardware accessories, machined surfaces, plated, lighting fixtures and similar items in place and not be finish coated, or provide surface applied protection prior to surface preparation and coating operations. Remove, if necessary, for complete coating of items and adjacent surfaces. Following completion of coating of each area, reinstall removed items. Mark or otherwise protect adjacent surfaces.

C. Concrete: All surfaces shall be sound, clean, dry and cured a minimum of 28 days prior to the application of primer and coatings. Such surface contaminants as dust, dirt, mildew, form oils, loose substrate, etc., shall be removed. Excessive form oils, release agents and curing compounds may require a light sandblasting.

D. Large Cracks: Large cracks, holes and voids must be filled with cement patching compound and TCA Tex-Bond cement adhesive. Texture of patch shall match texture of existing surface. Remove all loose material from area. Vee out cracks. Dampen areas with water. Apply with brush, spray or roller to areas being patched. Over dampened surface, using suitable tool such as a trowel, apply stucco or cement patching containing Tex-Bond in proper mix proportions as recommended by manufacturer.

E. Small Cracks: Cracks over 1/16-inch and no greater than 1/8-inch shall be filled with Flex-Patch patching compound. Fine surface cracks shall be veed out prior to application of Flex-Patch. Surface must be clean and dry. Stir Flex Patch thoroughly before using. Do not thin. Use wide, broad knife for application over smooth surfaces. If rough stipple is required, use a short bristle brush. Cure a minimum of 48 hours before coating.

F. Surfaces: Prior to the application of primer or coating, all existing areas should be examined and determined to be a sound, tightly bonded surface. Areas unsound, not tightly bonded should be repaired according to proper installation procedures. All joints and openings shall be sealed and roof shall be installed and sealed.

3.4 COATING APPLICATION

A. Interfacing wall joints shall be filled with two part urethane type sealant. Over clean, dry surface apply primer per manufacturer's printed technical data at a rate of 250 to 300 square feet per gallon.

B. Materials Preparation: Mix and prepare coating materials in accordance with manufacturer's direction. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of coatings in a clean condition, free of foreign materials and residue. Stir materials before application to product a mixture of uniform density, and stir into material. Remove film and if necessary, strain material before using.

C. Application: Applying coating in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

D. Coating System: Over primed, clean, dry surface apply TEX-Cote 600 on fluted surfaces with two coats at a rate of 90 to 100 square feet per gallon per coat and on smooth surfaces it is acceptable to apply one coat at a rate of 45 to 50 square feet per gallon. Apply in desired texture and color with recommended spray equipment. Application of TEX-COTE 600 shall be at a uniform film thickness over entire surface being covered at a coverage rate of 45 to 50

square feet per gallon. A wet edge shall be maintained at all times during spraying to prevent lapmarks, and that edge shall be feathered or fogged out widely. If applicator must stop mid-wall at end of day, an area up to 4 feet wide should be fogged in. Avoid starting and stopping midway on wall. Continue to a natural break such as a panel edge of corner. On large areas, two workers spraying simultaneously is recommended to avoid lapmarks and spray patterns.

E. Cleaning and Protection: During progress of work, remove from site discarded coating materials, rubbish, cans and rags at end of each work day. Upon completion of coating work, clean window glass and other coating splattered surfaces. Protect work of other trades, whether to be coated or not against damage by coating and finishing work. Correct any damage by cleaning, repairing or replacing, and recoating, as acceptable to FAA. Provide "wet paint" signs as required to protect newly-coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations. At the completion of work of other trades, touch-up and restore all damaged or defaced surfaces.

END OF SECTION 09 94 13

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Public-use washroom accessories.
2. Underlavatory guards.
3. Custodial accessories.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated on Drawings.
2. Identify products using designations indicated on Drawings.

C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by COTR.

1.4 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.5 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.

B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch minimum nominal thickness.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Basis-of-Design Product: The design for accessories is based on products indicated on Drawings. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. General Accessory Manufacturing Co. (GAMCO).

2.3 UNDERLAVATORY GUARDS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Plumberex Specialty Products, Inc.
2. TCI Products.
3. Truebro, Inc.

B. Underlavatory Guard:
1. Description: Insulating pipe covering for supply and drain piping assemblies, that prevent direct contact with and burns from piping, and allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded-plastic, white.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to FAA's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 28 00

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SECTION 11 00 00 – EQUIPMENT FURNISHED BY CONTRACTOR

PART 1 - GENERAL

1.1 SUMMARY

A. The contractor shall be responsible for providing the following materials:

1. Two Portable Hand Carry Lights:
   The lights shall be general purpose with die cast aluminum housings with hinged door-frame for easy lamp installation/replacement. The handles shall provide a cool to touch grip. The lights shall have a safety yellow finish. The light-head is to be impact resistant, waterproof gasket lens with removable wire lamp guard. The lamp shall be a minimum of 500W quartz lamp with minimum lumens of 11,100. The cord shall be an all-weather cord and at least 12-ft long. The light is to be UL Listed. An acceptable manufacturer is Regent Model# PQ-500WL or equivalent.

2. Caution Hearing Protection Required in this Area Sign:
   One self-adhesive sign in safety yellow with black lettering reading "CAUTION HEARING PROTECTION REQUIRED IN THIS AREA" with pictorial shall be provided with minimum dimensions of 7" H x 10" W. The sign shall be in compliance with 29 CFR 1910.145. This sign is to be given to the RE for proper implementation. An acceptable manufacturer is Lab Safety Model# Graphic-Alert OA-20799SS or equivalent.

3. Travel Eye-Flush Unit:
   One carry-along eye-flush unit shall be provided with a minimum of six 8.0-oz hand-held squeeze bottles of eye solution for effective irrigation of eye injuries. Each hand-held bottle shall be individually sealed and dated. The Travel Eye-Flush Unit shall be in compliance with ANSI Z358.1-1998. The case should have high visibility graphics for quick easy identification. An acceptable manufacturer is **fend·all** Eyesaline® Travel Pack (Lab Safety Model # OA-9787) or equivalent.

4. Flammable Liquid Storage Cabinet:
   One flammable liquid storage cabinet shall be provided with vent openings, an adjustable shelf, and comply with OSHA and NFPA 30 specifications. The cabinet shall be yellow and have a capacity of at least 12 gallons with minimum dimensions of 35"H x 23¼"W x 18"D. Provide manufacturer approved seismic hold-down clamps. An acceptable manufacturer is JUSTRITE® "Compac" Safety Cabinets Justrite Model #25710 with seismic adaptor kit #25960 or equivalent. The cabinet shall be installed in the Engine-Generator Shelter on the back wall to the right side of the Engine-Generator.

5. Two Telephones:
   Provide a telephone for the Equipment Room and the Engine Generator Room. The telephones shall be wall mountable telephones. They shall be capable of being operated as hands free speaker phones complete with electronic hold and mute functions. They shall have a redial feature. An acceptable manufacturer is General Electric Model 2-9316.

6. Fire Extingusher

   Provide three (3) wall hung 20 pound A.B.C. rated fire extingushers.

7. Dock Lift, scissors type:

A. Provide a scissors type dock lift for the equipment building with a capacity of 4,000 lbs, a platform sizeof 6 x 6 ft, and overall size of 76 x 92 in. The lowered height shall be 5.25 in. with a travel of at least 53". The bridge size of 18 x 60 in. and a chock/ramp size of 30 x 60 in. The dock lift shall have a 2 HP motor and approximately 8 FPM of speed. The warranty for the structural assembly shall be for 10 years from date of shipment from the manufacturer and the warranty for the hydraulic assembly shall be for 2 years from the date of shipment from the manufacturer. An acceptable manufacturer is Advance Lifts, Inc. Model No. 1045.

END OF SECTION 11 00 00

SECTION 12 59 00 - SYSTEMS FURNITURE

PART 1 - GENERAL

1.1 DESCRIPTION
Provide specified furniture and set in place in the Equipment Room.

1.2 QUALITY ASSURANCE
Ensure that the furniture provided is the product of a manufacturer normally engaged in the production of the products required.

1.3 SUBMITTALS
Catalog cuts of all furniture proposed for use.

PART 2 - PRODUCTS

2.1 MATERIALS

ITEM	QUANTITY	DESCRIPTION
A	2	STORAGE CABINET: Global Model WY237635GY Dimensions: 36-in. wide x 18-in. deep x 78-in. high Number of shelves per unit: 4 Color: All Gray Heavy gauge, fully reinforced cabinet with adjustable shelves. All shelves adjustable on 2 in. center. Equip with three-way locking device. Piano hinged doors. Baked enamel finish.
B	1	WORKBENCH: Workplace Systems Inc. Series 1000 Tubeframe Table with a Mica-Stat Conductive Top and a minimum of two 20 amp 120V polarized duplex receptacles. Part#: A10023060-T-8523FM (or approved equal) Dimensions: 30" to 37" adjustable height with a 30" X 60" surface area. The work surface must be made of a material that prevents static discharges.
C	1	STOOL: Global Model No. WY571119 with casters Black frame, 5 leg caster base, upholstered seat and back, adjustable backrest, seat height adjusts from 23" to 27", wraparound footrest chrome.

D	1	RADAR SITE WORKSTATION: 1 each Mayline 48" E-LAN Workstation Part Number 21148 3 each Mayline Keyboard Trays Part Number 19500 3 each Mayline Mousepad Support Part Number 19502 1 each Mayline 48" W Shelf Part Number 2204818 This may be ordered as a unit from the following distributor: Office Environments of New England 280 Summer Street Boston, MA 02210-1169 Phone: (617) 443-6777

The furniture shall be the items listed above, or approved equals, except for Item D which has no substitutions.

WORKPLACE SYSTEMS, INC
562 Mammoth Road
Londonderry, NH 03053
Call: 1-800-258-9700

GLOBAL INDUSTRIAL
Call: 1-888-978-7759

Mayline ®
619 North Commerce Street
P.O. Box 728
Sheboygan, WI 53082-0728
1.800.822.8037

END OF SECTION 12 59 00